(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 493 856 A2**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number: **91203360.2**

(51) Int. Cl.5: **B65D 81/00**, B65D 81/20

(22) Date of filing: **18.12.91**

(30) Priority: **19.12.90 NL 9002815**

(43) Date of publication of application:
08.07.92 Bulletin 92/28

(84) Designated Contracting States:
BE DE DK FR GB NL SE

(71) Applicant: **Sara Lee/DE N.V.**
Keulsekade 143
NL-3532 AA Utrecht(NL)

(72) Inventor: **Vroonland, Christoffel Antonius Johannes**
Aviatik 9
NL-3769 JK Soesterberg(NL)
Inventor: **Peters, Antonius Johannes Maria**
Boterbloemstraat 8
NL-5321 RR Hedel(NL)

(74) Representative: **Smulders, Theodorus A.H.J., Ir. et al**
Vereenigde Octrooibureaux Nieuwe Parklaan 97
NL-2587 BN 's-Gravenhage(NL)

(54) **Filter cartridge.**

(57) This invention relates to a filter cartridge of which the top and bottom are covered with filter paper, the space so formed containing a granular extractable material and the gas in the filter cartridge substantially consisting of CO_2.

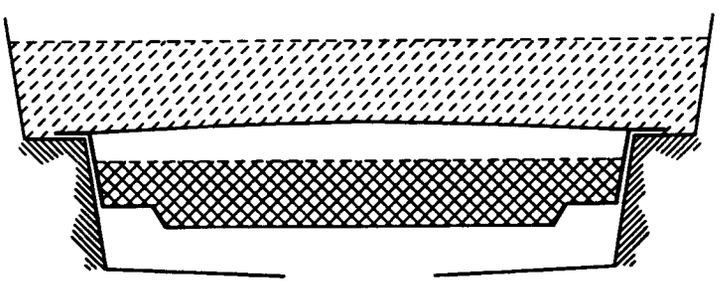

FIG. 3

EP 0 493 856 A2

A filter cartridge for making coffee typically consists of a mostly plastics housing comprising a wall having its top and bottom covered with filter paper, the space so formed containing ground coffee or another extractable material. Also known are cartridges in which the upper and lower filter papers are joined together at the circumferential edge.

When such filter cartridges are used in coffee making, the filter cartridge can optionally be placed in a filter pan, whereafter hot water is added. During the subsequent extraction, gases are released from the coffee and the gas or gas mixture in the filter cartridge heats up, so that a pressure is built up in the filter. Owing to this pressure build-up, the upper filter bulges, with the result that the brewing water fails to sink through or sinks through slowly, which prolongs the brewing time to an unacceptable extent.

Generally, during the packaging of coffee, an inert gas such as nitrogen is added to prevent the coffee from coming into contact with oxygen, so as to avoid oxidative ageing and concomitant loss of flavor.

The above-mentioned problem has been recognized previously and described in European patent application 361 569. The solution proposed in that publication is to use an upper filter that is folded in cold condition. During the brewing process, the filter can move outwards if a pressure build-up occurs. In that event, the pressure in the space below the upper filter remains limited, enabling percolation of brewing water within a reasonable period of time.

A drawback of this solution is that it requires the use of more paper. Moreover, the folded design of the upper filter increases the risk of damage to the upper filter in packages where the filter cartridges are packed in stacks. The bulging of the upper filter may lead to the brewing water following a preferred route of flow along the outer edge of the filter cartridge. The water is thus allowed to leak away from the highest point to the lower edge.

The object of the invention is to overcome the above-mentioned disadvantages of the known filter cartridges. The present invention is based on the surprising insight that no or substantially no build-up of pressure occurs in a filter cartridge that has been packed using CO_2.

The present invention is accordingly directed to the use of CO_2 in a filter cartridge having the construction as described above, whereby no or substantially no pressure build-up occurs owing to the presence of CO_2 . The filter cartridge of the invention is accordingly characterized in that the gas within the filter cartridge substantially consists of CO_2 and any gases released from the coffee after packing.

It is observed that it is well known to use various protective gases, including CO_2, during the packaging of coffee in coffee filters. However, heretofore this has been done only to prevent oxidative ageing of the coffee due to oxygen. In respect of the use of CO_2, there is not anywhere any evidence of the insight that, instead of the conventionally used nitrogen, CO_2 in the filter cartridge could have the present advantage.

The construction of the filter cartridge that is used in accordance with the invention is not critical. The various known systems can be used without difficulties in respect of the percolation time. Examples of such filter cartridges are described, e.g., in European patent applications 338,289; 272,922; 254,446; 211,511; and 224,297.

NL patent application 90,02072 discloses a filter cartridge in which a part of the water can freely flow past the cartridge, either via a separate channel or via an off-centred water feed, so that a part of the upper filter of the filter cartridge remains dry for some time. Gases can escape via the dry portion, so that no or substantially no build-up of pressure occurs.

Generally, as an extractable material, coffee is used, but it is also possible to use other extractable materials for preparing hot drinks, e.g., tea, maize, and chicory, as well as mixtures of these, and mixtures of these with coffee.

In addition to coffee and/or another extractable material, the filter cartridge mainly contains CO_2 and any gases that have been released from the coffee after packing.

The finished filter cartridge is introduced into a still open outer package or container, whereafter the air can be removed from the whole by evacuation through suction or in any other suitable manner, such as flushing with CO_2. In the case of evacuation by suction, the whole is subsequently gassed with CO_2. Finally, the outer package or container is heat-sealed.

Thus, a filter cartridge is obtained in which the coffee is disposed in a CO_2 atmosphere.

Preferably, substantially pure CO_2 is used, i.e., the CO_2 content of the gas is at least 90%, more particularly at least 95% by volume, calculated on the gas that is supplied during packing. It will be clear that the release of gases from the coffee after packaging can lead to some degree of dilution of the CO_2.

The present invention will be explained, by way of example, with reference to the accompanying drawings showing a filter cartridge comprising a plastics housing. In said drawings:

Fig. 1 is a cross-section of a conventional filter cartridge during filtration;

Fig. 2 is a similar, schematic cross-section of a more expensive embodiment of a solution to the problem addressed by the present invention; and

Fig. 3 is a schematic cross-section of an apparatus according to the invention.

Referring to the drawing figures, there is shown a filter cartridge comprising an annular wall 1 having a supporting rim 2. The filter cartridge is covered at the top by means of an upper filter 3 and at the bottom by a lower filter 4. Provided in the filter are an amount of ground coffee 5 and nitrogen as an inert gas. This filter cartridge is arranged in a filter pan 6 to which an amount of brewing water 7 has been added. As will appear from Fig. 1, the upper filter bulges during brewing as a consequence of the pressure arising in the space above the coffee. As a result, the water does not percolate or percolates slowly.

Fig. 2 shows a variant of a filter cartridge as claimed in claim 1, already incorporating a (more expensive) solution to the problem of the pressure build-up. Incorporated in this embodiment are pipelets 8 comprising passages so as to permit the gases under the upper filter to escape in the manner indicated in Fig. 2 by arrows 9.

In the filter cartridge shown in Fig. 3, constructionally similar to the cartridge of Fig. 1, the coffee has been packaged using CO_2 gas. The upper filter proves to bulge only to a very minor extent and in any case to a considerably lesser extent than in the device of Fig. 1. The brewing water is now permitted to percolate readily and properly.

Comparative tests of the filter disclosed in European patent application 361 569 supplied with nitrogen as an inert gas and the same filter cartridge supplied with CO_2 have been performed using a mild type of coffee, viz., Douwe Egberts Boncafé, and a high-roasted blend (Rich Roast). Tables 1 and 2 present the respective results and further indicate the influence of the degree of hardness of the water.

TABLE 1

(Boncafé)			
Brewing time (min) (± s.d.)			
Degree of hardness of water (° DH)	7	14	21
Nitrogen	8.6 ± 0.4	9.5 ± 0.6	11.5 ± 0.8
CO_2	6.8 ± 0.3	7.3 ± 0.5	8.7 ± 0.8

TABLE 2

(Rich Roast)			
Brewing time (min) (± s.d.)			
Degree of hardness of water (° DH)	7	14	21
Nitrogen	10.2 ± 0.8	11.1 ± 0.6	13.7 ± 0.8
CO_2	7.5 ± 0.3	8.0 ± 0.4	8.7 ± 0.7

These Tables clearly show that the use of CO_2 provides a significant improvement in regard of brewing time without any disadvantages.

Claims

1. A filter cartridge having its top and bottom covered with filter paper, the space so formed containing a granular extractable material and the gas in the filter cartridge substantially consisting of CO_2.

2. A filter cartridge as claimed in claim 1, wherein the gas in the filter cartridge consists as to at least 90% by volume of CO_2.

3. A filter cartridge as claimed in claim 1 or 2, wherein the gas consists as to at least 95% by volume of CO_2 and as to the rest of gases that have been released from the coffee after packing.

4. A filter cartridge as claimed in claims 1-3, wherein the granular extractable material has been selected from the group consisting of coffee, tea, maize and chicory, as well as mixtures of two or more of these

materials.

5. A filter cartridge substantially as described and explained with reference to the drawing figures.

6. A set of filter cartridges in a container, wherein the gas in the filter cartridge and in the container substantially consists of CO_2.

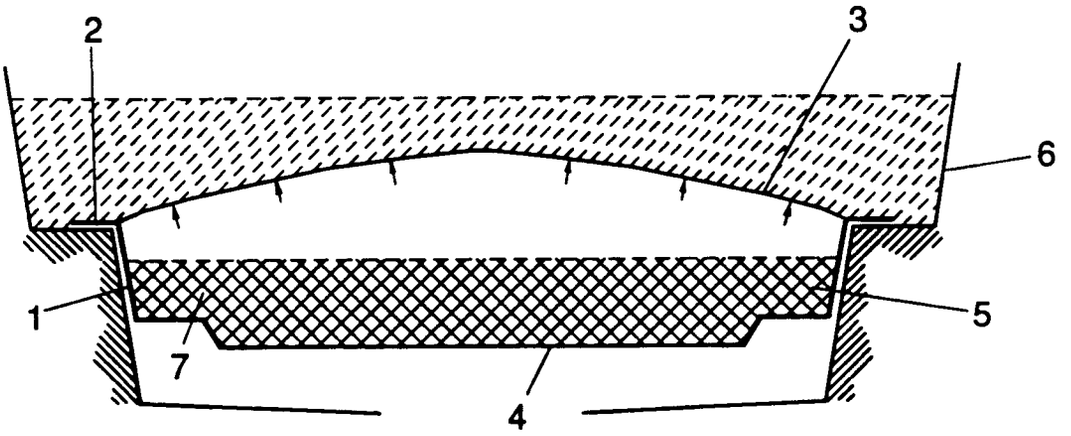

FIG. 1

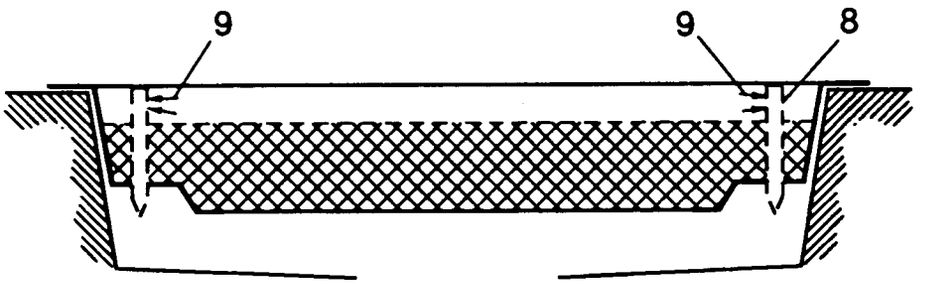

FIG. 2

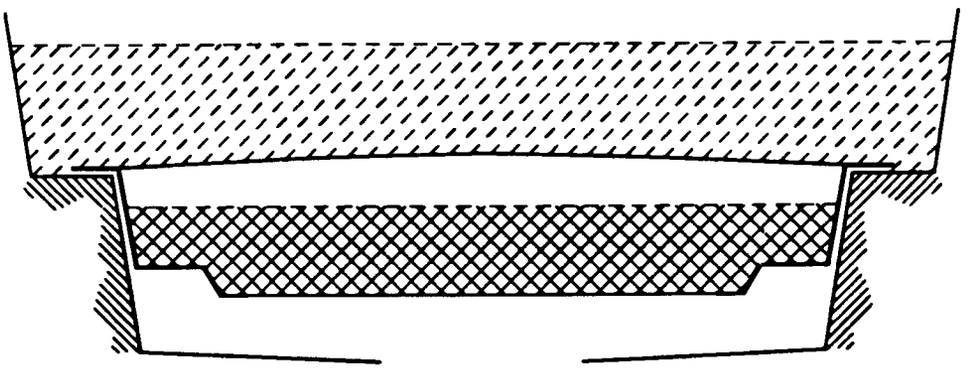

FIG. 3